



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/836,490	04/17/2001	Bradley N. Maker	M-9939 US	8530

36257 7590 05/03/2005

PARSONS HSUE & DE RUNTZ LLP
655 MONTGOMERY STREET
SUITE 1800
SAN FRANCISCO, CA 94111

EXAMINER

PROCTOR, JASON SCOTT

ART UNIT	PAPER NUMBER
----------	--------------

2123

DATE MAILED: 05/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/836,490

Applicant(s)

MAKER, BRADLEY N.

Examiner

Jason Proctor

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 April 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) 2,3 and 42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-41 and 43-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/21/2004
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claims 1-46 were rejected in previous office action dated September 13, 2004. Claims 2, 3, and 42 have been canceled. Claims 1, 14, 25, and 36 have been amended. New claim 47 has been added. Claims 1, 4-41, and 43-47 have been submitted for reconsideration.

Claims 1, 4-41, and 43-47 have been rejected.

Request for Status

Applicants' request for the status of the instant application dated April 15, 2005 has been acknowledged. In light of this office action, no further notice is deemed necessary.

Response to Claim Rejections – 35 U.S.C. § 112

1. Regarding the rejection of claims 1, 14, and 36 as single means/step claims,

Applicant argues that:

MPEP 2164.08(a) applies to single means claims and cites *In re Hyatt*, 708 F.2d 712. *Hyatt* indicates that a "single means claim" is a claim drafted in "means-plus-function" format yet reciting only a single element instead of a combination. *Id.* Not a single one of claims 1-24 and 34-36 that the Examiner has rejected on this basis are drafted in means plus function format under 35 U.S.S. § 112, paragraph 6. This rejection therefore lacks merit and is moot.

The Examiner presumes Applicant refers to claims 1-24 and 36-46 which were rejected as single means claims, not 1-24 and 34-36 as appears above. The Examiner acknowledges Applicants' argument that none of claims 1-24 and 36-46 are drafted in concise means-plus-function format. However, the 3-prong analysis as prescribed by

Art Unit: 2123

MPEP 2181(I) renders these claims open to 35 U.S.C. § 112, sixth paragraph, interpretation. The following is a quotation of MPEP 2181(I):

Accordingly, these guidelines provide applicants with the opportunity to either invoke or not invoke 35 U.S.C. 112, sixth paragraph, based upon a clear and simple set of criteria. Limitations that fall within the scope of 35 U.S.C. 112, sixth paragraph, include:

[...]

(E) reducing the coefficient of friction of the resulting film [step plus function; "step" unnecessary], *In re Roberts*, 470 F.2d 1399, 176 USPQ 313 (CCPA 1973); and

(F) raising the pH of the resultant pulp to about 5.0 to precipitate *Ex parte Zimmerley*, 153 USPQ 367 (Bd. App. 1966).

In the event that it is unclear whether the claim limitation falls within the scope of 35 U.S.C. 112, sixth paragraph, a rejection under 35 U.S.C. 112, second paragraph may be appropriate.

The rejection of claims 1-24 and 36-46 as single means claims was based not on the format in which they were drafted but rather on this analysis of the claims, especially as similar to the examples quoted above. Applicant has failed to clarify whether these claims fall under the scope of 35 U.S.C. § 112, sixth paragraph, however it is noted that these claims are not drafted in concise means-plus-function format. The Examiner respectfully requests clear indication from Applicant regarding the intended scope of these claims in relation to 35 U.S.C. § 112, sixth paragraph, in the response to this action. Also, please see MPEP 2181(V).

2. Applicants' arguments have made it unclear whether these claims fall under the scope of 35 U.S.C. § 112, sixth paragraph. As a result, the rejection of these claims under 35 U.S.C. § 112, first paragraph is withdrawn and rejections under 35 U.S.C. § 112, second paragraph have been entered.

Art Unit: 2123

3. Regarding the rejection of claims 1-46 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, Applicant argues primarily:

As will be seen below and in the specification itself, the selected claim terms are well known to those of ordinary skill in the art and are described in the specification. Therefore, it is kindly asserted that the claim do particularly point out and distinctly claim the subject matter to one of ordinary skill in the art.

Applicant properly supports this statement by citing the specification (page 4, line 19 – page 6, line 9 regarding the explicit method and, *inter alia*, page 4, lines 5-18 regarding the implicit method).

4. The Examiner thanks Applicant for indicating the portions of the specification that support these definitions as known in the art. The Examiner finds Applicants' arguments persuasive inasmuch as the terms under discussion are merely broad, not indefinite. The claims therefore recite limitations defining a scope beyond that which was disclosed by the specification.

5. The rejections of these claims under 35 U.S.C. § 112, second paragraph, as vague and indefinite have been withdrawn. The Examiner apologizes for any inconvenience. The Examiner attempted to interpret these limitations generally according to the disclosed methods and apologizes if Applicant found those interpretations inappropriate.

Response to Drawing Objections

The Examiner thanks Applicant for amending the drawings in response to the objections of the previous office action. Those objections have been withdrawn.

Response to Abstract Objections

The Examiner thanks Applicant for amending the title of the abstract in response to the objections of the previous office action. Those objections have been withdrawn.

Response to Claim Rejections – 35 U.S.C. § 102

6. Regarding the rejection of claims 1, 2, 5, 7-10, 12, 14, 16, 18-21, 23, 25, 27, 29-32, 34, 36, 38, and 40-43 under 35 U.S.C. § 102(e) as being anticipated by US Patent No. 6,353,768 to Karafillis et al. (Karafillis), Applicant primarily argues:

While Karafillis does teach that the prior art includes an explicit version, and an implicit version, these are described as separate individual versions – *Karafillis does not teach* a single version having both implicit *and* explicit functionality. Furthermore, Karafillis does not teach any switching (manual or automatic) between implicit and explicit methodology (or vice versa) at any time, whether in its description of prior systems or of the invention of Karafillis.

The Examiner has considered these arguments and finds them persuasive. Specifically, Karafillis does not teach a single version having both an implicit and explicit functionality as put forth by Applicants' arguments. The Examiner disagrees that Karafillis does not anticipate the broad claim language as presented, however these rejections have been withdrawn.

7. Regarding the rejection of claims 1, 3, 4, 6, 7, 11, 13, 14, 15, 17, 18, 22, 24, 25, 26, 28, 29, 33, 35, 36, 37, 39, 40, and 44 under 35 U.S.C. § 102(b) as being anticipated by LS-DYNA Keyword User's Manual by Livermore Software Technology Corporation, Applicant primarily argues:

Art Unit: 2123

Each of pending claims 1-35, as amended, either directly or by virtue of dependency, recites automatically switching between the implicit and explicit method two or more times, i.e. from implicit to explicit to implicit, or from explicit to implicit to explicit. The LS-DYNA User's Manual does not teach this. In practice, a currently implemented embodiment of the present invention may switch back and forth between methods many times during a finite element analysis or simulation.

The Examiner traverses these arguments as follows.

8. While the Examiner is generally persuaded by Applicants' arguments, the claim language does not adequately reflect the clarity and definiteness presented by those arguments. Claim 1, for example, places no temporal constraints on "performing a finite element simulation". As the prior art shows, performing an iterative design process using finite element simulation is well known; thus a simulation that automatically switches from implicit to explicit once will commonly be used to switch two or more times. The claim language makes no attempt at excluding this interpretation. The claims make no reference to the well known implicit and explicit methods of performing a finite element analysis as presented in Applicants' arguments. These rejections have been maintained.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. § 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 1, 4-41, and 43-47 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in

Art Unit: 2123

the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

10. Claims 1, 14, 25, 36, and 47 recite limitations represented by claim 1, which claims (emphasis added) “A method for performing a finite element simulation, the method comprising automatically switching between an implicit method and an explicit method two or more times during the finite element simulation.”

11. The disclosure of the instant application and Applicants’ arguments regarding the previous rejection of the emphasized terms under 35 U.S.C. § 112, second paragraph, are directed toward “The well known explicit method” (page 14, paragraph beginning as quoted, emphasis added) and “The well known Implicit method” (page 16, paragraph beginning as quoted, emphasis added). However, the limitations represented by claim 1 recite a method comprising “automatically switching between an implicit method and an explicit method” (emphasis added). These claims are not limited to the disclosed and well-known explicit or implicit method. Rather, the generic terms “an implicit method” or “an explicit method” could conceivably cover any number of methods that are, in some respect, characterized by being somehow “implicit” or “explicit”. The phrases “an implicit method” and “an explicit method” are not limited to the well known implicit and explicit methods of performing a finite element analysis.

12. Were the limitations of these independent claims limited to the implicit and explicit methods of performing a finite element analysis as disclosed, then the scope of the claimed invention and the scope of the disclosure would be commensurate. The Examiner would like to emphasize Applicants’ arguments (page 15, entire page; page

Art Unit: 2123

17, entire page – page 18, until paragraph beginning “When the correct equilibrium solution is found) as a source for claim language that could resolve the issues under 35 U.S.C. 112 as well as assist in distinguishing Applicants’ invention from the prior art.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 1, 4-24, 36-41, and 43-47 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear whether claims 1, 14, and 36 should be interpreted according to 35 U.S.C. § 112, sixth paragraph, after applying the 3-prong analysis prescribed by MPEP 2181 and consideration of Applicants’ arguments as indicated above. Applicant has persuasively argued that none of claims 1-24 and 36-46 are drafted in means plus function format, and the Examiner makes a similar observation regarding claim 47, however the 3-prong analysis of MPEP 2181 appears to favor interpreting these claims under 35 U.S.C. § 112, sixth paragraph. It is further noted that Applicant is reading details from the specification into the claims. This would suggest that Applicant is invoking his rights under 35 U.S.C. § 112, sixth paragraph.

Claims rejected but not specifically mentioned stand rejected by virtue of their dependence.

Claim Rejections - 35 USC § 101

35 U.S.C. § 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

14. Claims 1, 4-41, and 43-47 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter.

15. Regarding claims 1, 14, 25, 36, and 47, MPEP 2106(II)(A) reads as follows:

The claimed invention as a whole must accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." *State Street*, 149 F.3d at 1373, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (*Brenner v. Manson*, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96); *In re Ziegler*, 992, F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)). Accordingly, a complete disclosure should contain some indication of the practical application for the claimed invention, i.e., why the applicant believes the claimed invention is useful.

16. These claims do not produce a useful, concrete, and tangible result. Indeed, a finite element simulation is a mathematical method or algorithm, and a particular method of performing a finite element simulation is therefore an abstract method that does not produce a tangible result. The Examiner respectfully suggests claiming these methods as concluding with a step of producing a display, communicating simulation results outside a computer, or some other step that achieves a useful, concrete, and tangible result.

17. Regarding claims 1 and 47, the claimed invention is not directed to the technological arts. A finite element simulation is a mathematical method or algorithm and is therefore not statutory subject matter. Please see MPEP 2106. The Examiner

Art Unit: 2123

respectfully suggests claiming the method as a computer-implemented method, thereby establishing a tangible embodiment for the invented method.

18. Regarding claims 14 and 25, the claimed invention is tangibly embodied but does not produce a useful, concrete, and tangible result as noted above.

19. Regarding claim 36, "a data signal embodied in a carrier wave" is not a proper tangible embodiment under 35 U.S.C. § 101. The claim is therefore directed to computer software not embodied in a tangible computer readable medium and is nonstatutory. The Examiner respectfully suggests claiming the method as embodied only on tangible media, such as those described in the specification (page 10, lines 20-25).

To expedite a complete examination of the instant application the claims rejected under 35 U.S.C. § 101 (nonstatutory) above are further rejected as set forth below in anticipation of applicant amending these claims to place them within the four statutory categories of invention.

Claim Rejections - 35 USC § 103

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. Claims 1, 4-41, and 43-47 are rejected under 35 U.S.C. § 103(a) as being unpatentable over LS-DYNA Keyword User's Manual by Livermore Software

Technology Corporation, hereafter referred to as LS-DYNA in view of US Patent No. 6,478,991 to Mancosu et al. (Mancosu) and further in view of US Patent No. 5,609,342 to Peterson et al. (Peterson).

22. Regarding claims 1, 14, and 25, LS-DYNA teaches software for performing a finite element simulation (pages I.1-I.2) wherein

an implicit method and an explicit method is used (pages 7.28-7.29, remarks for IMFLAG value 2) and

automatically switching from the implicit method to the explicit method during the simulation (page 7.29, remarks for IMFLAG value 2; page 18.8, Remarks for Seamless Springback).

LS-DYNA does not explicitly recite automatically switching two or more times during the finite element simulation. However, official notice is taken that an iterative design process using finite element simulation is well known in the art (See Mancosu, column 7, lines 52-58; Peterson, column 5, lines 54-58). By using such an iterative design process, a person of ordinary skill in the art using the software taught by LS-DYNA would perform a finite element simulation which automatically switches between an implicit method and an explicit method two or more times. Additionally, LS-DYNA teaches activating the (implicit) seamless springback analysis with a "small restart input deck", allowing a user to continue a previous forming analysis (page 18.8, Remarks for Seamless Springback), thus facilitating this behavior.

Additionally, a finite element simulation of a metal forming process that involves two operations would render a finite element simulation which automatically switches

between an implicit method and an explicit method two or more times obvious to a person of ordinary skill in the art at the time of Applicants' invention. LS-DYNA clearly teaches an implicit method that switches to an explicit method to simulate the springback of a metal sheet. A process that involves two forming operations (stamp, springback, second stamp, second springback) in combination with the teachings of LS-DYNA would provide motivation for a finite element simulation that automatically switches between an implicit method and an explicit method two or more times.

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention in combination with his own knowledge of the particular art to modify or use the teachings of LS-DYNA as appropriate to arrive at the claimed method.

23. Regarding claims 4 and 5, LS-DYNA teaches that the finite element simulation begins the finite element simulation using an implicit method or using an explicit method (pages 7.28-7.29). LS-DYNA teaches that the simulation may be restarted with a small restart input deck in order to include a springback analysis (page 18.8). It would have been obvious to a person of ordinary skill in the art at the time of Applicants' invention to use the features of a software tool such as that taught by LS-DYNA, motivated by situations set forth above, to arrive at the claimed method.

24. Regarding claims 6 and 7, LS-DYNA teaches ending the finite simulation when the total termination time, expressed as a standard termination time and a number of

Art Unit: 2123

time steps in the springback analysis, is reached while using an implicit method or an explicit method (pages 7.28-7.29, Variable Description for IMFLAG value 2 and NSBS).

25. Claims 8-10 recite various triggers for switching from the implicit to the explicit method including a predetermined threshold for a number of iterations, a predetermined threshold for internal energy, and a predetermined threshold for a length of time. These trigger conditions are primarily functionally equivalent; they address difficulties inherent in an implicit method and invoke the explicit method to mitigate those difficulties. LS-DYNA explicitly acknowledges the difficulties of the implicit model (pages 18.8-18.9, Remarks for Seamless Springback). LS-DYNA addresses this by performing a multi-step springback analysis with smaller, more manageable time steps (page 18.9). LS-DYNA teaches an artificial stabilization feature that retries portions of the simulation when the implicit method encounters difficulties (page 18.9). LS-DYNA also teaches restarting the simulation with different methods (page 18.8).

It would have been obvious to a person of ordinary skill in the art at the time of Applicants' invention, in combination with the teachings of LS-DYNA, to identify where the implicit method encounters difficulty and to restart the simulation at that point with the explicit method.

26. Regarding claim 11, LS-DYNA teaches an explicit simulation which reaches its termination time and switches to and concludes with an implicit simulation to perform springback analysis (pages 7.28-7.29; 18.6-18.9, "Remarks for Seamless Springback").

27. Regarding claims 12 and 13, LS-DYNA teaches the use of finite element simulation to simulate the formation and springback of a metal shape (page I.7, "Trim curves for metal forming springback"; pages 18.6-18.9, "Remarks for Seamless Springback").

28. Claims 14-24 are rejected with the same reasons given for claims 1 and 4-13 above. Claims 14-24 are computer product claims reciting the same limitations as the method claims 1 and 4-13. LS-DYNA Version 950 is a computer software product (LS-DYNA, pages I.1-I.12).

29. Claims 25-35 are rejected with the same reasons given for claims 1 and 4-13 above. Claims 25-35 are computer system claims reciting the same limitations as the method claims 1 and 4-13. LS-DYNA Version 950 is a computer software product (LS-DYNA, pages I.1-I.12).

30. Claim 36 is rejected for the same reasons given for claim 9 above. Claim 36 is a computer system claims reciting the same limitations as the method of claim 9. LS-DYNA Version 950 is a computer software product (LS-DYNA, pages I.1-I.12).

31. Claims 37-41 and 43-46 are rejected for the same reasons given above for claims 4-8 and 10-13. The combination of these limitations would have been obvious to a person of ordinary skill in the art as set forth above regarding claims 1 and 4-13. As

Art Unit: 2123

LS-DYNA teaches or renders obvious all of the limitations of claims 1 and 4-13, reciting these limitations in different combinations as in claims 36-46 does not distinguish them from the cited prior art.

32. Claim 47 is rejected for the same reasons given for claims 8 and 10 above. Claim 47 is a method claim that combines the limitations of claims 8 and 10. As LS-DYNA teaches or renders obvious all of the limitations of claims 1 and 4-13, reciting these limitations in different combinations as in claim 47 does not distinguish them from the cited prior art.

Conclusion

Art considered pertinent by the examiner but not applied has been cited on form PTO-892. The Examiner has provided a more complete version of the LS-DYNA reference for Applicants' convenience.


This action contains new grounds of rejection. As a result, this action is non-final.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Proctor whose telephone number is (571) 272-3713. The examiner can normally be reached on 8:30 am-4:30 pm M-F.

Art Unit: 2123

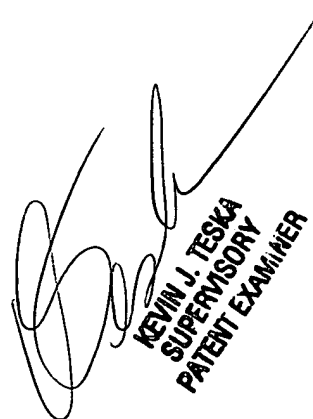
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J Teska can be reached on (571) 272-3716. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-3713.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



jsp

Jason Proctor
Examiner
Art Unit 2123



KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER